16. A NOTE ON THE EARLY DEVELOPMENT OF THE MARINE INSECT *HALOBATES* SP. FROM THE GULF OF MANNAR NEAR MANDAPAM

(*With a text-figure*)

The occurrence of *Halobates* eggs on different floating material has been reported earlier by various authors. A cuttle-bone with eggs of *Halobates* sp. (Fig. 1A) was collected four miles off Vedalai (09° 15′ N, 79° 07′ E) on 24th September 1965. Since there is little information on the *Halobates* eggs and their development from this region, some observations were made on them and are presented in this note.

Several barnacles of the genus *Lepas*, with their shells covered by the eggs of the insect were attached to both sides of the cuttle-bone. A number of polychaetes were also seen in the burrows on the cuttle-bone which suggests that the cuttle-bone must have been floating in the sea for a number of days.

The convex side of the cuttle-bone was more densely covered by the eggs (12 per sq mm) than the concave side (4 per sq mm) (Fig. 1, B). The eggs were embedded in a transparent gelatinous matrix. The eggs were long and uniformly broad with smooth egg membrane. The length varied from 0·64 to 0·87 mm and the breadth 0·35 to 0·41 mm (of Delsmans 1·1 and 0·42). Majority of the eggs were orange-yellow in colour but scattered amongst them were a few patches of brownish-black eggs, evidently in an advanced stage of development. Certain other eggs were yellowish-white in colour with premature embryos inside. These different degrees of development of the eggs clearly indicate that several females must have laid the eggs at different times, on the cuttle-bone as was pointed out by previous authors.

Inside the early stages of eggs which were orange-yellow, the embryo was characterised by three pairs of unsegmented legs, a pair of eyes and the rudiment of the labrum (Fig. 1, C & D) and in the advanced stage of eggs the legs had become segmented and the compound eyes prominent (Fig. 1, E). The cuttle-bone with eggs was kept in running sea water in the aquarium at a temperature of 27·5° C and room temperature of 31·5°C. Transition into the nymphal stage was rapid and the nymphs hatched out on the fifth day after collection. The eggs hatched out in a natural rhythm, batch after batch, as if they had been laid at different times. The nymphs were carefully transferred to a big glass trough containing sea water which was changed once a day. The newly hatched nymphs were pale yellow in colour but turned dark brown in about six hours. The head, thorax and segmented abdomen were distinct. The antennae and mouth parts were well developed (Fig. 1, F & G). The nymphs

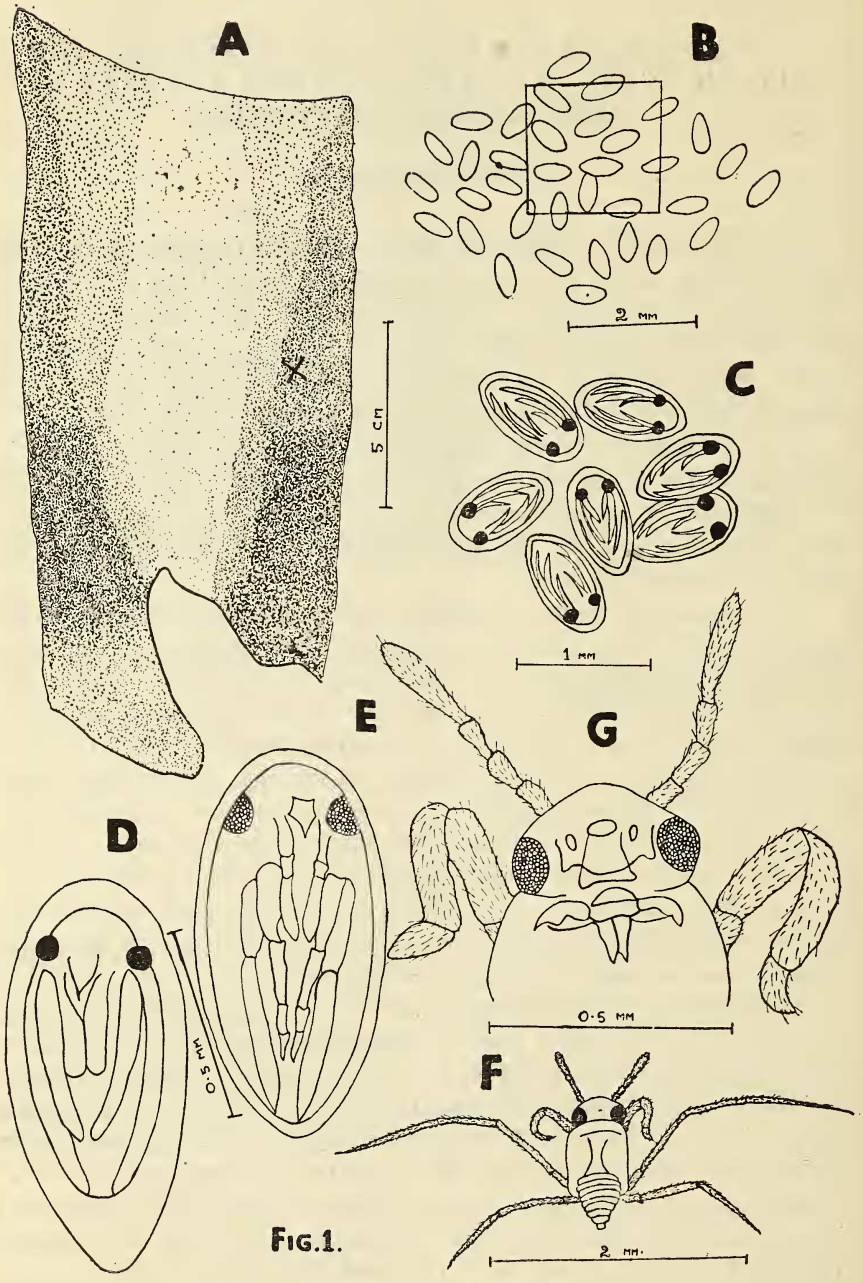

FIG. 1.

A. Cuttle-bone showing the intensity of eggs of *Halobates* sp. on the convex side.
B. The arrangement of eggs and their number in one sq. mm (at the area marked × in Fig. 1 A).
C. Early embryos.
D. Enlarged view of an early embryo, ventral view.
E. Enlarged view of a late embryo, ventral view.
F. The nymph (larva) dorsal view.
G. Enlarged view of anterior portion of the nymph, ventral view, to show the mouth parts.

were observed to move swiftly on the surface of the water just like the adult. There was a tendency to prefer the edges of the trough rather than the centre. Attempts to feed them with mashed fresh clam meat suspended in water and alternatively in dry glass trough proved futile. They survived for two days only. The nymphs continued to hatch in good numbers on the first two days but the hatching rate gradually declined and finally ceased on the tenth day after collection.

I am not quite sure as yet to which species of *Halobates* these eggs belong. Herring (1958) has classified *Halobates* into two distinct groups. The ' open Ocean ' group which occurs at considerable distance from land with individuals taken near the shore only after severe storms and the ' coastal ' group with species that are highly endemic to islands or island groups. According to this division the present material in all probability belongs to the second one as they were collected near an island. Herring (1961) observed that twelve days were required for the egg to hatch. The present material hatched out into tiny nymphs on the fifth day after collection. It is reasonable to think that it might not have travelled many miles in about seven days specially when there was practically no storm or heavy winds during this time. Again, as mentioned earlier the eggs containing premature embryos inside suggest that they must have been laid only a few days before collection. Based on these facts it is probable that this insect belongs to coastal group of species.

Gravely (1927) collected some female specimens from almost the same area as the present one and feels that his specimens agree in all respects with White's *H. sobrinus*. But according to Herring (1961, p. 252) ' judging from extensive collections it now appears certain that *sobrinus* is confined to the west coast of America and the Kinberg's label of Tahiti is in error.' Herring in his monograph has described 38 species belonging to the genus *Halobates* and has for 36 species shown their geographical distribution on a map. Among these two species *H. micans* Eschscholtz and *H. flaviventris* Eschscholtz have been recorded close to the area of the present material. Besides these two, *H. formidabilis* Distant has been recorded from the Chilka Lake on the Bay of Bengal by Annandale and Kemp (1915). *H. germanus* White (1883) *H. trynae* Herring (1964) have also been reported from the Bay of Bengal and *H. galatea* Herring (1961) near Bombay on the Arabian Sea.

In a recent paper Lana (1971) has mentioned that ten species of *Halobates* were recorded from the Indian Ocean and the adjacent seas. These include two Oceanic species, *H. micans* and *H. germanus*, and eight species, *H. alluaudi*, *H. formidabilis*, *H. proavus*, *H. tethys*, *H. poseidon*, *H. galatea*, *H. hayanus* and *H. flaviventris*, confined to coastal waters. Comparing the above species to those of Herring's geographical distribution map, we get two species, *H. micans* and *H. flaviventris* which occur close to the place of present material. Lana (1971) has observed that

most of the eight species mentioned as coastal are rather restricted in their distribution in the Indian Ocean area but *H. flaviventris* is found from the Bay of Bengal to the coast of Tanzania.

It is probable that the eggs and nymphs described belong to *H. flaviventris* as *H. micans* is considered to be an oceanic species.

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August 21, 1971.

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17. BUTTRESS-LIKE STRUCTURES ON THE UPPER PART OF THE TRUNK OF *CEIBA PENTANDRA* (L.) GAERTN.

(*With a plate*)

The White Silk Cotton tree, *Ceiba pentandra* (Syn. *Eriodendron anfractuosum* DC.) is well known for its basal buttresses (Plate).

The object of the present note is to point out the occurrence of wing-like structures resembling buttresses in the angles between the branches and the main trunk, observed in two large specimens of *C. pentandra*, one growing in the Botanical Garden and the other in a private garden in Pondicherry. Buttress-like structures are also observed on the main trunk, having no connections either with the branches or the true buttresses. In smaller trees a tendency towards formation of such structures on the trunk is noted though they are not well formed. The only other tree for which this phenomenon is observed is a Burseraceae, *Canarium commune* L. (Richards 1957).

Buttresses are defined as the supporting roots arising above the ground level and growing downwards and outwards into the ground (Lloyd 1950). Richards (l.c.) defines them as the flat, triangular plates sub-

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